Low Cost UAS for Mapping via Google Application

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UAS

- RS 16
  - 16’ wing spread
  - 13,000’ ceiling
  - 16 hour flight time
  - 25 pound load
- Photogrammetry Payload
- Direct GeoReferencing
Low Cost Drone

Micro GPS Sensor
L1 and L2
RTK
IBM Silicon Germanium SiGe

(Lyle and Wilson, 2000 Institute for Navigation GPS 2000)
Low Cost Drone

Digital Imagery
- Direct Georeference with RTK GPS
- CCD/CMOS
- Full Frame Video
- RTK GPS 50 km baseline
- Shift, rotation, and scale

Field Test
- NASA Rocket

(Lyle, 2007 NASA Tech Briefs)
Smartphone RTK

Local Wi-Fi Network

Real Time Map

2G/3G/4G

RTN GPS: VRS or RTCM Server

(Lyle, Smith, Nygard 2011, ION)
USDA: Low Cost Machine Control

RTK Cellphones Solution
Ublox L1 C/A Phase
RTKLib
GeoRTK

(Lyle, 2013, *Experiment to test RTK GPS with Satellite “Internet to Tractor” for Precision Agriculture* International Journal of Agricultural and Environmental Information Systems)
L1 RTK Horizontal
Considerations

• DIY Drone- Open Sources
  – GPS Machine Control
    • 100 hz
    • Latency
  – Copter or Airplane
    • Autopilot
    • Mission Planning Software

• Arduunio
  – Drone Control
Application Steps

1. App starts - Settings
2. Survey Type
3. Start Job
4. **Smart phone gets Position**
   1. Wifi, AGPS, DGPS, PPP, or RTK
5. Surveying started with selected accuracy
6. Real Time Mapping and/or Control
7. App closed
Thank You

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